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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/582,464

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Volker Geyer

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EXAMINER

PILLAY, DEVINA

ART UNIT

PAPER NUMBER

4133

MAIL DATE

DELIVERY MODE

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PAPER

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

<b>Office Action Summary</b>	<b>Application No.</b> 10/582,464	<b>Applicant(s)</b> GEYER ET AL.	
	<b>Examiner</b> Devina Pillay	<b>Art Unit</b> 4133	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☐ Responsive to communication(s) filed on \_\_\_\_.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1-5 is/are pending in the application.  
4a) Of the above claim(s) \_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-5 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).  
a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- |   |   |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)   | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. ____. |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)  | 5) <input type="checkbox"/> Notice of Informal Patent Application                       |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)<br>Paper No(s)/Mail Date <u>06/12/2004</u> . | 6) <input type="checkbox"/> Other: ____.  |

## DETAILED ACTION

### ***Claim Rejections - 35 USC § 103***

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

3. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

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4. Claims 1- 5 are rejected under 35 U.S.C. 103(a) as being unpatentable over Meissner et al. (US 6488770B1) in view of Xu et. al (US5039653) in view of Schulz et al. (US612740).

Regarding claim 1 Meissner et al. discloses a method for the production of a powder consisting of a  $\text{Cu(In,Ga)Se}_2$  compound comprising the following steps (Abstract, C2/L44-49):

- alloying Cu and at least one of In and/or Cu and Ga to form at least one of a CuIn alloy and a CuGa alloy (C2/L44-49).
- heating the mixture until a melt is formed in which  $\text{Cu(In,Ga)Se}_2$  recrystallizes and, at the same time, the powder particles to be produced grow (C2/L56-58)
- cooling the melt in order to interrupt the growth of the particles (C3/L5-12).

The reference does not explicitly state that Se is added with NaI or KI instead the reference says that the fluxing agent used is NaCl (C2/L44-49, C2/L50-55). Since the prior art of Xu et al. (US5039653) recognizes the equivalency of any NaCl and KI as a fluxing agent ([0029]). It would have been obvious to one of ordinary skill in the art at the time of the invention to replace the NaCl of Meissner et al. with KI as it is merely the selection of functionally equivalent for a fluxing agent recognized in the art and one of ordinary skill in the art would have a reasonable expectation of success in doing so.

Meissner et al. also specifically does not state that Cu is sub-stoichiometric with respect to Ga/In. As suggested by Schultz et al. the amount of Cu in the alloy can be controlled by the processing temperature (C2/L42-46). As the efficiency of solar cell

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produced is a variable that can be modified, among others, by adjusting the composition of the CuInSe film, the precise composition would have been considered a result effective variable by one having ordinary skill in the art at the time the invention was made. Accordingly, one of ordinary skill in the art at the time the invention was made would have optimized, by routine experimentation, the composition of the semiconductor to obtain the desired efficiency (In re Boesch, 617 F.2d. 272, 205 USPQ 215 (CCPA 1980)), since it has been held that where the general conditions of the claim are disclosed in the prior art, discovering the optimum or workable ranges involves only routine skill in the art. (In re Aller, 105 USPQ 223).

Regarding claims 2 Meissner et al. teaches all the claim limitations as set forth above and further teaches that the method for the producing a powder consisting of a Cu(In,Ga)Se<sub>2</sub> compound (Abstract, C2/L44-49) comprises:

- after the cooling step removing the KI or NaI is removed by dissolution with water (C3/L5-12). It is well known in the art that alkali metal halides such as NaCl and KI are soluble in water.

Regarding claim 3 Meissner et al. states that each component can be present in the melt in the same stoichiometric composition as that of the powder to be produced. Although Meissner does give that a CuInSe<sub>2</sub> will be produced which indicates a molar ratio of 1. Schulz et al. indicates that modifications to the recrystallization process alter the amount of Cu present in the final product (C2/L40-46). As the efficiency of solar cell produced is a variable that can be modified, among others, by adjusting the composition of the CuInSe film, the precise composition would have been considered a result

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effective variable by one having ordinary skill in the art at the time the invention was made. As such, without showing unexpected results, the precise composition cannot be considered critical. Accordingly, one of ordinary skill in the art at the time the invention was made would have optimized, by routine experimentation, the composition of the semiconductor to obtain the desired efficiency (In re Boesch, 617 F.2d. 272, 205 USPQ 215 (CCPA 1980)), since it has been held that where the general conditions of the claim are disclosed in the prior art, discovering the optimum or workable ranges involves only routine skill in the art. (In re Aller, 105 USPQ 223).

Regarding claim 4 Meissner et al. does disclose that these monocrystalline membrane can include Ga (C2/L44-49, Claim 13). However Meissner does not give specific ratios of Ga to In to Cu. Schulz et al. make a  $\text{CuIn}_{(1-x)}\text{Ga}_x\text{Se}_2$  product through the mixing and reacting of each of the component salts. Schultz et al. also discloses that indium can be substituted for gallium and that the ratio if In to Ga can be adjusted (C5/L43-46).

Regarding claim 5 Meissner et al. teaches all the claim limitations as set forth above and further teaches that the powder as disclosed in instant claim 1 can be used to form a mono-particle solar cell (C3/L24-36, C1/L48-50). Although the reference does not sat what the solar cell comprise. It is well known in the art that a typical solar cell will comprise a back contact, a semiconductor layer and a front contact in order to be functional as evidenced by Schulz (US 6126740).

***Conclusion***

5. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Devina Pillay whose telephone number is (571)270-1180. The examiner can normally be reached on Monday thru Friday 7:30am -5:00pm (EST).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Basia Ridley can be reached on 571-272-1453. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Kaj K Olsen/  
Primary Examiner, Art Unit 1795

/D. P./  
Examiner, Art Unit 4133